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10/698,318	10/31/2003	Jon Irvin Stuckey	P02073US2ABENT	9814

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EXAMINER

GULL, RUSSELL

ART UNIT	PAPER NUMBER
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2123

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10/09/2008

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/698,318

Applicant(s)

STUCKEY, JON IRVIN

Examiner

Russ Guill

Art Unit

2123

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 21 July 2008.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-18 and 21-24 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-18, 23 and 24 is/are rejected.
- 7) ☒ Claim(s) 21 and 22 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 29 June 2007 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

1. This Office Action is in response to an amendment filed July 21, 2008. No claims were canceled or added. Claims 1 – 18 and 21 – 24 are pending and have been examined. Claims 1 – 18 and 23 – 24 have been rejected. Claims 21 – 22 are objected to.
2. **First, the Examiner would like to thank the Applicant for the very well presented response. The Examiner appreciates the effort to carefully analyze the Office Action, and make appropriate and clear arguments and amendments.**

Response to Remarks

3. Regarding claim 15 rejected under 35 USC § 112, second paragraph:
 - a. Applicant's amendment to the claim overcomes the rejection.
4. Regarding claim 18 rejected under 35 USC § 112, second paragraph:
 - a. Applicant's arguments have been fully considered, and are persuasive.
5. Regarding claim 21 rejected under 35 USC § 112, second paragraph:
 - a. Applicant's amendment to the claim overcomes the rejection.
6. Regarding claims 1 - 14 rejected under 35 USC § 103, second paragraph:
 - a. Applicant's arguments have been fully considered, but are not persuasive, as discussed below.
 - b. The Applicant argues:
 - c. The Office Action rejects claims 1-2, 6, and 11 as being obvious over Sekula in view of Kogure. The Office Action also rejects claims 3-5, 7-10, and 12-14 as being obvious over the Sekula/Kogure combination in further view of Stuckey. The Applicant respectfully traverses these rejections. Each of these claims is based on the method recited in

independent claim 1 which requires the modulation orders to be selected and defined prior to the development of the pitch sequence. The Applicant submits the combination of Sekula with Kogure fails to disclose, teach, or suggest this method. Further, the Applicant submits both references teach away from the claimed solution. As such, the Applicant submits the Office Action has not established a *prima facie* of obviousness with respect to independent claim 1 or any of its dependent claims.

- i. The Examiner respectfully replies:
- ii. Applicant's arguments appear to be a summary introduction. The issues raised are discussed below. However, in this paragraph, the arguments amount to allegations with no supporting rationale.

d. The Applicant argues:

e. Turning to the Graham analysis, the Applicant notes that in determining obviousness, one must (1) determine the scope and content of the prior art; (2) ascertain the differences between the prior art and the claimed invention; and (3) resolve the level of ordinary skill in the pertinent art. *Graham v. John Deere Co.*, 383 U.S. 1, 17 16, 148 USPQ 459, 467 (1966). Secondary considerations such as commercial success, long felt but unsolved need, and failure of others are also considered. *Id.* Thus, one first looks to the content of the Sekula and Kogure references and then identifies the differences between their content and the claimed invention. The determination of obviousness is made against this background. The Office bears the burden of establishing a *prima facie* case of obviousness. The teaching, suggestion, motivation analysis provides a helpful insight to whether or not an invention is obvious in view of the combination of other references. The MPEP sets forth that to establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestions or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined)

must teach or suggest all the claim limitations. The teaching or suggestions to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure. M.P.E.P. § 2142. Further, a patent composed of several elements (or steps) is not proved obvious merely by demonstrating that each element was, independently, known in the prior art.

- i. The Examiner respectfully replies:
- ii. No arguments appear to be present in the above paragraph.

f. The Applicant argues:

g. Sekula discloses a method for defining a tire noise pitch sequence from target audio spectrum such as a white noise spectrum. Sekula performs an inverse Fourier transform of a single period of the target audio spectrum, adjusts the result to define a period proportional to the circumference of the tire, and then divides the result by the number of desired pitches. The pitch lengths are defined by the amplitude of the curve. The Applicant respectfully traverses the conclusion set forth in the Office Action that Sekula's selection of an audio spectrum discloses the "defining" steps of claim 1. The modulation order characteristics of Sekula's generated spectrum are not known, never calculated, and are certainly not defined as required by claim 1.

- i. The Examiner respectfully replies:
- ii. First, as a minor issue, claim 1 was amended to replace "defining" by "selecting", and thus claim 1 has no "defining" steps.
- iii. Second, the modulation order characteristics of Sekula's generated spectrum are known, calculated and defined, as follows. A careful analysis of Sekula shows that the "output spectrum generator" (figure 1, element 11) defines modulation order characteristics as shown in figure 2A (amplitude versus frequency). As discussed in Sekula at column 2, lines 25 – 30, column 4, lines 31 – 55, the output spectrum generator produces a set of amplitudes, which are at least functionally equivalent to

the modulation order characteristics. Thus, this would have reasonably suggested to the ordinary artisan the modulation order characteristics. Then the Fast Fourier Transformer (figure 1, element 12) generates the waveform associated with the amplitudes (see especially column 3, lines 35 - 40; element 12 generates an *INVERSE* Fourier transform signal) by performing an inverse Fourier transform.

h. The Applicant argues:

i. However, claim 1 requires the first and second modulation orders to be defined to be smaller or equal to the third modulation order. Such a limitation is not disclosed in the Sekula reference. The selection of an audio spectrum in Sekula does not necessarily define the modulation orders in this manner. The drawback with the Sekula method is explained in Applicant's specification on page 3 with reference to Figs. 1 and 2. A pitch sequence yielding a desirable harmonic response in the audio spectrum may have undesirable modulation. This problem is addressed in the inventor's earlier patent publication US 2003/0040886 (now US Patent 7,006,930) wherein a secondary screening technique is disclosed. Sekula's method of design a pitch sequence is formed on the audio spectrum without regard for the secondary modulation noise. Sekula's method may thus create a tire noise pitch sequence having undesirable modulation as discussed on page 3 of Applicant's specification. Sekula thus does not disclose, teach, or suggest the steps of selecting and defining the modulation orders as recited in claim 1.

i. The Examiner respectfully replies:

ii. First, Sekula appears to teach selecting and defining modulation orders as discussed above.

iii. Second, the rejection is based upon both Sekula and Kogure. As recited in the rejection, Sekula is not relied upon to teach the first and second modulation orders to be defined to be smaller or equal to the third modulation order; rather Kogure teaches the limitation. One cannot show

nonobviousness by attacking references individually where the rejections are based on combinations of references.

j. The Applicant argues:

k. The Applicant also respectfully traverses the conclusion in the Office Action that Sekula's inverse Fourier transformation discloses the steps of creating individual modulation order functions and summing the created functions. Sekula discloses that the fast Fourier transformation (12) only acts on an audio spectrum that has already been generated by the audio spectrum generator (11). Sekula's method does not contemplate using the fast Fourier transformer to create and sum functions for the modulation orders as recited in claim 1.

i. The Examiner respectfully replies:

ii. A prior art reference must be considered together with the knowledge of one of ordinary skill in the pertinent art. A reference need not explain every detail since it is speaking to those skilled in the art. *In re Paulsen*.

iii. Sekula's inverse Fourier transformation obviously creates individual modulation order functions and sums the created functions. The purpose and function of an inverse Fourier transformation is to sum a set of sine/cosine functions, each sine/cosine function being multiplied by an amplitude that is input (see especially column 4, lines 32 – 46). The generated sine/cosine is functionally equivalent to a modulation order function (especially see column 4, lines 35 – 35, "may be expressed as an infinite series in trigonometric form"; it would have been obvious that the series was composed of trigonometric sine/cosine functions).

iv. Obviousness must be determined in light of the knowledge of the ordinary artisan. Prior art is not limited just to the references being applied, but includes the understanding of one of ordinary skill in the art.

The following references teach knowledge of the ordinary artisan at the time of invention.

v. The MPEP recites in section 2121.01: A reference contains an “enabling disclosure” if the public was in possession of the claimed invention before the date of invention. “Such possession is effected if one of ordinary skill in the art could have combined the publication’s description of the invention with his [or her] own knowledge to make the claimed invention.” *In re Donohue*, 766 F.2d 531, 226 USPQ 619 (Fed. Cir. 1985).

vi. Thus, Sekula would have reasonably suggested the limitation to the ordinary artisan.

l. The Applicant argues:

m. The Applicant also respectfully traverses the conclusion set forth in the Office Action that Sekula defines the pitch sequence from the summation of the modulation order functions. Sekula teaches that the pitches are defined by an adjusted result of the inverse fast Fourier transformation of the audio spectrum. Defining a pitch sequence directly from the audio spectrum without regard to the modulation orders can yield undesirable results as noted above. Sekula thus does not disclose, teach, or suggest the step of defining a pitch sequence from the summation of modulation order functions.

i. The Examiner respectfully replies:

ii. The result of the inverse fast Fourier transformation is the summation of the modulation order functions, as discussed above. Since the pitches are defined by the result of the inverse fast Fourier transformation, the pitches are thus defined from the summation of the modulation order functions. A prior art reference must be considered together with the knowledge of one of ordinary skill in the pertinent art.

A reference need not explain every detail since it is speaking to those skilled in the art. *In re Paulsen*.

n. The Applicant argues:

O. Given the significant differences between claim 1 and the Sekula reference, the addition of the Kogure teachings does not render the invention obvious under section 103. Kogure merely teaches that the modulation orders under ten should be studied. Kogure concludes that varying the periods results in a dispersion of the pulsation. Kogure thus does not select a number of modulation orders, does not define the orders with functions, and does not sum the functions. Kogure merely teaches that an analysis of the modulation orders is needed. This teaching, however, is acknowledged as prior art in Applicant's specification (page 8, line 4). Kogure thus discloses something that the Applicant already recognizes in its application. Kogure's use of this information leads in a different direction from that of the claimed invention. Kogure's solution to the pulsation problem is substantially different than Applicant's claimed invention. The combination of the Kogure teachings with the Sekula method would have led those of ordinary skill in the art to vary the fundamental periods of the sequence generated by the Sekula method (see Kogure, Col. 3, lines 30-45). Kogure thus teaches away from the claimed method and the combination of Kogure with Sekula does not yield the claimed invention.

- i. The Examiner respectfully replies:
- ii. Disclosed examples and preferred embodiments do not constitute a teaching away from a nonpreferred embodiment. The prior art's mere disclosure of more than one alternative does not constitute a teaching away from any of these alternatives because such disclosure does not criticize, discredit, or otherwise discourage the solution claimed.
- iii. Kogure does not criticize the claimed method, and thus does not teach away from the method.

p. The Applicant argues:

q. The Stuckey reference cited as a tertiary reference against some of the dependent claims discloses a secondary screening technique to compare pitch sequences designed under other prior art design methodologies. The addition of the Stuckey teachings to the combination of Kogure and Sekula leads of ordinary skill in the art to compare different pitch sequences generated by the Kogure/Sekula teachings to determine which is better. The pitch sequences designed and compared by this combination would still be based on Sekula's audio spectrum combined with the period shifts of Kogure. The combined teachings of all three references does not render the method of claim 1 obvious. The Applicant thus respectfully requests the rejections of claims 1-14 to be withdrawn.

i. The Examiner respectfully replies:

ii. As discussed above, Sekula and Kogure appear to teach the limitations of claim 1, and thus the teachings of Stuckey are not needed. Accordingly, the rejections of claim 1 and dependent claims are maintained.

7. Regarding claims 15 - 18 rejected under 35 USC § 103, second paragraph:

a. Applicant's arguments have been fully considered, but are not persuasive, as discussed below.

b. The Applicant argues:

c. The Office Action rejects claims 15-17 as being obvious in view of Sekula combined with Stuckey. Claims 18 and 23-24 have been rejected as being obvious in view of the Sekula/Stuckey combination in further view of Kogure. The Applicant respectfully traverses the rejections. As explained above, Sekula discloses a method for designing a pitch sequence from a desirable audio frequency spectrum while Stuckey discloses a secondary screening technique for analyzing the differences between competing pitch sequences such as those designed by Sekula. Claim 15 requires the design process to first define characteristics of tire

noise attributed to the lug stiffness variations and then define the tire noise pitch sequence that yields the defined characteristics. Claim 15 thus has a completely different starting point for the pitch sequence design than the Sekula reference. Stuckey does not provide motivation for changing the starting point of the Sekula design methodology to that recited in claim 15. Stuckey leads one of ordinary skill in the art to avoid undesirable results by testing a plurality of Sekula pitch sequences and selecting the one with the best results.

- i. The Examiner respectfully replies:
- ii. As recited above, "Sekula discloses a method for designing a pitch sequence from a desirable audio frequency spectrum". In Sekula, the "desirable audio frequency spectrum" defines the characteristics of tire noise attributed to the lug stiffness variations. In Sekula, "designing a pitch sequence" defines the tire noise pitch sequence that yields the defined characteristics. Thus Sekula appears to teach to first define characteristics of tire noise attributed to the lug stiffness variations and then define the tire noise pitch sequence that yields the defined characteristics. Accordingly, the rejection is maintained.
- iii. Stuckey is not needed to teach the limitation, and thus is not relevant.
- iv. Further, it was common knowledge of the ordinary artisan to specify design criteria for an object, and then design the object to satisfy the design criteria. This common knowledge combined with Sekula also renders the claim obvious.

d. The Applicant argues:

e. Stuckey does not contain motivation for altering the design methodology of Sekula to achieve the invention of claims 15-17. The addition of the Kogure teachings does not change the result.

- i. The Examiner respectfully replies:

ii. As recited in the rejection below, the motivation would have been the benefit recited in Stuckey that the invention allows eliminating tire designs having undesirable tire noise before sample tires are produced (paragraph [0026]).

8. Regarding claims 21 - 22 rejected under 35 USC § 103, second paragraph:

a. Applicant's arguments have been fully considered, but are not persuasive, as discussed below.

b. The Applicant argues:

c. The Office Action rejects claims 21-22 as being obvious in view of the combination of Sekula, Kogure, and Stuckey. The Applicant respectfully traverses the rejections. The content of these prior art references is noted above. The Applicant maintains, as above, that the combination of these references does not render the claimed invention obvious. The claimed invention requires the modulation orders to be selected, defined, and summed. A lug stiffness variation curve is then equated to the summation of the modulation order curves. This equation is then solved to determine the pitch sizes for the pitch sequence. The prior art combination cited in the office action disclosed a methodology that defines the pitches from an audio frequency spectrum (Sekula) and then alters the periods of the pitch sequence (Kogure) to vary the tire noise. The addition of the Stuckey reference teaches that different sequences may then be compared to select a more desirable sequence. Nothing in the combination of references motivates one of ordinary skill in the art to change the methodology of Sekula by abandoning the audio frequency spectrum in favor of defined modulation characteristics as required in claim 21. The Applicant thus submits claim 21 and its dependent claim are patentable over the cited art.

i. The Examiner respectfully replies:

ii. As recited above, "Nothing in the combination of references motivates one of ordinary skill in the art to change the methodology of Sekula by abandoning the audio frequency spectrum in favor

of defined modulation characteristics as required in claim 21". As discussed previously, the audio frequency spectrum is functionally equivalent to modulation characteristics. The audio frequency spectrum is defined, and thus the modulation characteristics are defined.

Claim Objections

9. If the Applicant has any questions regarding the following objections, then the Applicant is invited to call the Examiner.

10. Claims 21 – 22 are objected to for the following informalities: the clarity of the claim would be improved by reciting *in a limitation* a specific machine that performs the method. A valid process under 35 USC § 101 must either 1) transform underlying subject matter, or 2) be tied to another statutory class, such as a particular apparatus. In order to qualify as a statutory process, the claim should positively recite the other statutory class to which it is tied, for example by identifying the apparatus that accomplishes the method steps. Otherwise, the method steps may be interpreted as entirely abstract data operations with no tangible result. A recitation of a computer in the preamble does not appear sufficient to tie a claim to another statutory class.

11. Claims 1 – 14 are objected to for the following informalities: The claims are objected to for reasons similar to claims 21 – 22 above.

12. Claims 15 – 17, 23 - 24 are objected to for the following informalities: The claims are objected to for reasons similar to claims 21 – 22 above.

13. Claims 12, 13 and 14 are objected to for the following informalities: The claims refer to the step of *defining* the amplitudes of the modulation orders. In the parent claim 1,

the word "defining" was replaced by "selecting", and thus the claims appear to need to be amended to reflect the amendment to claim 1.

14. Claim 11 is objected to for the following informalities: the claim recites the step of selecting the number of modulation orders. Reference to the previous limitation should remain consistent to avoid any possible confusion or antecedent issues.

Claim Rejections - 35 USC § 103

15. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

16. **Claims 1 – 2, 6 and 11** are rejected under 35 U.S.C. 103(a) as being unpatentable over Sekula (U.S. Patent Number 4,442,499) in view of Kogure (U.S. Patent Number 5,383,506).

- a. The art of Sekula is directed to a method for producing pneumatic tires having pre-selected noise characteristics (Title and Abstract).
- b. The art of Kogure is directed to the art of pneumatic tires having reduced noise (Title and Abstract).
- c. The art of Sekula and the art of Kogure are analogous art because they both contain the art of noise reduction for pneumatic tires.
- d. Regarding **claim 1**:
- e. Sekula appears to teach:
 - i. selecting at least a first, a second, and a third modulation order (**figure 1, element 11, and figure 2A, spectral amplitudes and frequencies: it would**

have been obvious that at least three modulation orders were produced, especially in light of Kogure, figure 9);

ii. selecting the amplitude for each of the selected modulation orders: ~~the amplitudes of the first modulation and second modulation orders being smaller than or equal to the amplitude of the third modulation order~~ (figure 1, element 11, and figure 2A; it would have been obvious that element 11 produced an amplitude of a modulation order; and figure 4; and column 2, lines 25 – 30; and column 4, lines 31 – 55; and column 10, lines 50 – 67);

iii. selecting the phase for each of the selected modulation orders (figure 1, element 12; it would have been obvious that element 11 produced a phase of a modulation order because in order for element 12 to sum the periodic functions cosine/sine, it would have required a phase; and figure 4; and column 2, lines 25 – 30; and column 4, lines 31 – 55; and column 10, lines 50 – 67);

iv. creating a function for each modulation order that includes the defined amplitude and phase of the modulation order (figure 1, element 12; it would have been obvious that element 12 produced a cosine and/or sine function for each modulation order; and figure 4; and column 2, lines 25 – 30; and column 4, lines 31 – 55; and column 10, lines 50 – 67);

v. summing the created functions for each modulation order to define a summation of the functions (figure 1, element 12; it would have been obvious that element 12 produced a wave that was the sum of the functions; and column 2, lines 20 – 25; and column 4, lines 31 – 55; and column 10, lines 50 – 67);

vi. defining a tire noise pitch sequence from the summation of the functions (column 2, lines 35 – 55; and column 10, lines 50 – 67).

f. Sekula does not specifically teach:

- i. ~~selecting the amplitude for each of the selected modulation orders~~, the amplitudes of the first modulation and second modulation orders being smaller than or equal to the amplitude of the third modulation order;
- g. Kogure appears to teach:
 - i. the amplitudes of the first modulation and second modulation orders being smaller than or equal to the amplitude of the third modulation order (**figure 9, graph of B6**);
- h. The motivation to use the art of Kogure with the art of Sekula would have been the benefit recited in Kogure that the invention provides a pneumatic tire improved in comfort through an improved pitch arrangement to reduce pulsation sound pressure level (**column 3, lines 5 - 14**).
- i. Therefore, as discussed above, it would have been obvious to the ordinary artisan at the time of invention to use the art of Kogure with the art of Sekula to produce the invention of claim 1.
- j. Regarding **claim 2**:
- k. Sekula appears to teach:
 - i. calculating a determined number of pitch sizes from the summation of the functions (**column 2, lines 15 – 55; and column 10, lines 50 - 67**).
- l. Regarding **claim 6**:
- m. Sekula does not specifically teach:
 - i. selecting a total number of pitches, a number of different pitch sizes, and pitch ratios; and fitting the determined number of pitch sizes to the selected number of pitch sizes.
- n. Kogure appears to teach:

- i. selecting a total number of pitches, a number of different pitch sizes, and pitch ratios; and fitting the determined number of pitch sizes to the selected number of pitch sizes (column 3, lines 5 – 45).
 - o. Regarding **claim 11**:
 - p. Sekula does not specifically teach:
 - i. selecting between 3 and 7 modulation orders.
 - q. Kogure appears to teach:
 - i. selecting between 3 and 7 modulation orders (column 3, lines 5 – 45; and figure 9).
17. Claims 3 -5, 7 - 10 and 12 - 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sekula as modified by Kogure as applied to **claims 1 - 2, 6 and 11** above, further in view of Stuckey (U.S. Patent Application 2003/0040886).
- a. Sekula as modified by Kogure teaches a method for designing a tire noise pitch sequence as recited in **claims 1 - 2, 6 and 11** above.
 - b. The art of Stuckey is directed to the art of analyzing tire tread patterns for tire noise.
 - c. Regarding **claim 3**:
 - d. Sekula does not specifically teach:
 - i. using the accumulation of the deviation of the arc length from the arc length of the mean pitch size.
 - e. Stuckey appears to teach:
 - i. using the accumulation of the deviation of the arc length from the arc length of the mean pitch size (paragraphs [0031] – [0039]).
 - f. The motivation to use the art of Stuckey with the art of Sekula as modified by Kogure would have been the benefit recited in Stuckey that the invention allows

eliminating tire designs having undesirable tire noise before sample tires are produced (paragraph [0026]).

g. Therefore, as discussed above, it would have been obvious to the ordinary artisan at the time of invention to use the art of Stuckey with the art of Sekula as modified by Kogure produce the invention of claim 3.

h. Regarding **claim 4**:

i. Sekula does not specifically teach:

i. interpolating a curve defined by the accumulation of the deviation of the arc length from the arc length of the mean pitch size.

j. Stuckey appears to teach:

i. interpolating a curve defined by the accumulation of the deviation of the arc length from the arc length of the mean pitch size (paragraphs [0031] - [0039]).

k. Regarding **claim 5**:

l. Sekula does not specifically teach:

i. selecting a total number of pitches, a number of different pitch sizes, and pitch ratios; and fitting the determined number of pitch sizes to the selected number of pitch sizes.

m. Kogure appears to teach:

i. selecting a total number of pitches, a number of different pitch sizes, and pitch ratios; and fitting the determined number of pitch sizes to the selected number of pitch sizes (column 3, lines 5 - 45).

n. Regarding **claim 7**:

o. Sekula does not specifically teach:

i. setting the selected number of pitch sizes to a number between 3 and 7.

- p. Kogure appears to teach:
 - i. setting the selected number of pitch sizes to a number between 3 and 7 (column 3, lines 35 – 40).
- q. Regarding **claim 8**:
- r. Sekula does not specifically teach:
 - i. identifying the range of determined number of pitch sizes and evenly dividing the identified range by the selected number of pitch sizes.
- s. Stuckey appears to teach:
 - i. identifying the range of determined number of pitch sizes and evenly dividing the identified range by the selected number of pitch sizes (paragraph [0040]).
- t. Regarding **claim 9**:
- u. Sekula does not specifically teach:
 - i. selecting the number of different pitch sizes to be 5 and selecting the pitch ratios to be 1.00, 1.10, 1.25, 1.40, and 1.50.
- v. Kogure appears to teach:
 - i. selecting the number of different pitch sizes to be 5 and selecting the pitch ratios to be 1.00, 1.10, 1.25, 1.40, and 1.50 (column 3, lines 5 – 45).
- w. Regarding **claim 10**:
- x. Sekula does not specifically teach:
 - i. selecting the number of different pitch sizes to be 3 and selecting the pitch ratios to be 1.00, 1.25, and 1.50.
- y. Kogure appears to teach:
 - i. selecting the number of different pitch sizes to be 3 and selecting the pitch ratios to be 1.00, 1.25, and 1.50 (column 3, lines 5 – 45).

z. Regarding **claim 12**:

aa. Sekula does not specifically teach:

- i. defining the amplitudes of the first and second orders to be smaller than the amplitudes of the remaining orders.

bb. Stuckey appears to teach:

- i. defining the amplitudes of the first and second orders to be smaller than the amplitudes of the remaining orders (figure 2D).

cc. Regarding **claim 13**:

dd. Sekula does not specifically teach:

- i. defining the amplitudes of the first and second orders to be zero.

ee. Stuckey appears to teach:

- i. defining the amplitudes of the first and second orders to be zero (figure 2D).

ff. Regarding **claim 14**:

gg. Sekula does not specifically teach:

- i. varying the amplitudes for the selected modulation orders.

hh. Stuckey appears to teach:

- i. varying the amplitudes for the selected modulation orders (figure 2D).

18. **Claims 15 - 17** are rejected under 35 U.S.C. 103(a) as being unpatentable over Sekula, in view of Stuckey (U.S. Patent Application 2003/0040886).

a. Regarding **claim 15**:

b. Sekula appears to teach:

- i. (a) first defining characteristics of the tire noise generated by a tire (column 2, lines 37 – 45; and figure 1, element 11);

- ii. (b) then defining a tire noise pitch sequence that yields the defined characteristics (column 2, lines 3 – 11 and lines 17 – 36; and column 10, lines 50 – 67).
- c. Sekula does not specifically teach (portions not taught are marked in *bold, italic, underline*):
 - i. (a) first defining the characteristics of the tire noise *generated by tire tread lug stiffness variations*;
- d. Stuckey appears to teach:
 - i. tire noise generated by tire tread lug stiffness variations (**Abstract**);
- e. The motivation to use the art of Stuckey with the art of Sekula would have been the benefit recited in Stuckey that the invention allows eliminating tire designs having undesirable tire noise before sample tires are produced (paragraph [0026]).
- f. Therefore, as discussed above, it would have been obvious to the ordinary artisan at the time of invention to use the art of Stuckey with the art of Sekula produce the invention of claim 15.
- g. Regarding claim 16:
- h. Sekula appears to teach:
 - i. Defining amplitudes of at least five modulation orders (figure 1, element 11, and figure 2A, spectral amplitudes and frequencies; it would have been obvious that at least three modulation orders were produced, especially in light of Kogure, figure 9; figure 1, element 11; it would have been obvious that element 11 produced an amplitude of a modulation order; and figure 4; and column 2, lines 25 – 30; and column 4, lines 31 – 55; and column 10, lines 50 – 67);
 - ii. Defining a phase for each modulation order (figure 1, element 12; it would have been obvious that element 11 produced a phase of a modulation

order because in order for element 12 to sum the periodic functions, it would have required a phase; and figure 4; and column 2, lines 25 – 30; and column 4, lines 31 – 55; and column 10, lines 50 – 67);

iii. Creating a function for each modulation order that includes the defined amplitude and phase of the modulation order (figure 1, element 12; it would have been obvious that element 12 produced a cosine function for each modulation order; and figure 4; and column 2, lines 25 – 30; and column 4, lines 31 – 55; and column 10, lines 50 – 67);

iv. Summing the created functions for each modulation order to create a wave Y having a curve (figure 1, element 12; it would have been obvious that element 12 produced a wave that was the sum of the functions; and column 2, lines 20 – 25; and column 4, lines 31 – 55; and column 10, lines 50 – 67);

i. Regarding claim 17:

j. Sekula appears to teach:

i. Solving the equation to obtain a unique set of pitch sizes (column 2, lines 17 – 36).

k. Sekula does not specifically teach:

i. Defining a lug stiffness variation curve (D_i) to be the accumulation of the deviation of the arc length from the arc length of the mean pitch size;

ii. Setting the lug stiffness variation curve equal to the curve of the Y wave to define an equation;

l. Stuckey appears to teach:

i. Defining a lug stiffness variation curve (D_i) to be the accumulation of the deviation of the arc length from the arc length of the mean pitch size (paragraphs [0031] – [0039]);

- ii. Setting the lug stiffness variation curve equal to the curve of the Y wave to define an equation (paragraphs [0031] – [0039]);

19. **Claims 18 and 23 - 24** are rejected under 35 U.S.C. 103(a) as being unpatentable over Sekula as modified by Stuckey applied to **claims 15 - 17** above, further in view of Kogure (U.S. Patent Number 5,383,506).

- a. Sekula teaches a method for defining tire noise pitch sequences as recited in claim 15 above.
- b. Regarding **claim 18**:
- c. Sekula does not specifically teach:
 - i. selecting a total number of pitches, a number of different pitch sizes, and pitch ratios; and fitting the unique number of pitch sizes to the selected number of pitch sizes.
- d. Kogure appears to teach:
 - i. selecting a total number of pitches, a number of different pitch sizes, and pitch ratios; and fitting the unique number of pitch sizes to the selected number of pitch sizes (column 3, lines 5 – 45).
- e. The motivation to use the art of Kogure with the art of Sekula would have been the benefit recited in Kogure that the invention provides a pneumatic tire improved in comfort through an improved pitch arrangement to reduce pulsation sound pressure level (column 3, lines 5 - 14).
- f. Therefore, as discussed above, it would have been obvious to the ordinary artisan at the time of invention to use the art of Kogure with the art of Sekula as modified by Stuckey to produce the invention of claim 18.
- g. Regarding **claim 23**:

- h. Sekula appears to teach:
 - i. Defining a level for a first modulation order, defining a level for a second modulation order, a level for a third modulation order (figure 1, elements 11 and 12, and figure 2A, specified frequency components; it would have been obvious that at least three orders are generated, especially in light of the art of Kogure, figure 9).
- i. Sekula does not specifically teach:
 - i. the levels of the first and second modulation orders being less than the level of the third modulation order.
- j. Kogure appears to teach:
 - i. the levels of the first and second modulation orders being less than the level of the third modulation order (figure 9, graph for B6; shows that the modulation order for the first and second modulation orders are less than the order of the third modulation order).
- k. Regarding **claim 24**:
- l. Sekula does not specifically teach:
 - i. Defining the level of the first modulation order to be zero and defining the level of the second modulation order to be zero.
- m. Stuckey appears to teach:
 - i. Defining the level of the first modulation order to be zero and defining the level of the second modulation order to be zero (figure 2D).

20. **Examiner's Note:** Examiner has cited particular columns and line numbers in the references applied to the claims above for the convenience of the applicant. Although the specified citations are representative of the teachings of the art and are applied to specific limitations within the individual claim, other passages and figures may apply as well. It is respectfully requested from the Applicant in preparing responses, to fully

consider the references in their entirety as potentially teaching all or part of the claimed invention, as well as the context of the passage as taught by the prior art or disclosed by the Examiner. The entire reference is considered to provide disclosure relating to the claimed invention.

Allowable Subject Matter

21. Regarding claims 21 – 22, any indication of allowability is withheld pending resolution of the outstanding issues.

Conclusion

22. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

23. A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

24. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Russ Guill whose telephone number is (571)272-7955. The examiner can normally be reached on Monday – Friday 9:30 AM – 6:00 PM.

25. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Paul Rodriguez can be reached on 571-272-375353. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Any inquiry of a general nature or relating to the status of this application should be directed to the TC2100 Group Receptionist: 571-272-2100.

26. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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